Unraveling the mystery of San Marcos Pueblo

July 1, 2014

The adobe structures of the once mighty San Marcos Pueblo eroded long ago, and all that is left for the untrained eye to see are mounds of dirt that easily could be mistaken for the natural sway of the land. Located off Highway 14 between Santa Fe and the village of Cerrillos, today's windswept archaeological site gives few clues that the settlement of approximately 2,000 rooms at ground-floor level alone may have the largest room count of any prehistoric pueblo in the United States.

San Marcos Pueblo likely was established in the middle to late 1200s, or by the early 1300s at the latest, and some four hundred years later played an active role in the Pueblo Revolt of 1680. The inhabitants of San Marcos abandoned their pueblo around that time and joined the Keres of Cochiti and San Felipe.

On a hot day in June, 2014, half the students enrolled in Los Alamos National Laboratory's Summer of Applied Geophysical Experience (SAGE) participated in

several types of research at the San Marcos site, while the other half attended classroom lectures in Santa Fe.

SAGE is a unique educational program that allows graduate and advanced undergraduate students in a variety of fields to deepen their understanding of geophysics, the study of the Earth's physical properties and evolution in space and time. Participants come from a multitude of American and international educational institutions, ranging from New Mexico State University to universities as far away as New Zealand.

"When applied to archaeological research, geophysical methods can detect buried features without having to excavate and disturb a site," explained Los Alamos National Laboratory geophysicist and SAGE co-director Scott Baldridge. "Although archaeological research has been periodically conducted at San Marcos since 1915, many questions remain. As a major pottery-making location and trading center for ceramics and turquoise, the pueblo had complex relationships with nearby and distant pueblos as well as with Plains Indians and later the Spanish church and settlers. At the northwest corner of today's archaeological site are the remains of a Spanish mission church and *convento* built in the early 1600s."

The SAGE faculty, teaching assistants and students who were visiting San Marcos on this particular June day divided themselves into four groups, each one using a different geophysical method to study what lies beneath the surface of the 75-acre site. Graduate student Kimberly Yauk and undergraduate students Emily Snyder and Boe Derosier started the day by learning to use a ground-penetrating radar instrument, which emitted radio waves into the ground, recorded echoes and constructed an image from the echoes. Troy Desouza, a representative of the Canadian firm that loaned the ground-penetrating radar instrument to SAGE, supervised the operation.

In the course of their day at San Marcos the students had a chance to rotate between teams and learn a variety of geophysical techniques while helping conduct research. And the site, too, benefitted from SAGE's multi-method approach, with each method providing different insights into San Marcos' unseen remnants under today's landscape.

"SAGE has blended teaching, research and hands-on field experiences in partnership with universities, federal agencies and industry since 1983," said Baldridge. "Most of SAGE's alumni have entered geoscience careers, with some working as university faculty or postdoctoral researchers, some employed by federal laboratories or the United States Geological Survey and others having joined the technical staffs of major companies, consulting firms and equipment manufacturers. While they are with us in New Mexico for several weeks, the students gain priceless experience and in the process have lots of fun."

For additional information on the Summer of Applied Geophysical Experience, visit the SAGE website. Applications for next year's summer session will be due in March 2015; a geophysics major is not required. The San Marcos site is managed by the Archaeological Conservancy.